

## REPORT

CD NO.

DATE OF INFORMATION 1950

DATE DIST. 7 Jun 1950

NO. OF PAGES 2

SUPPLEMENT TO  
REPORT NO.

THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF ESPIONAGE ACT 50 U.S.C., 31 AND 32, AS AMENDED. ITS TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW. REPRODUCTION OF THIS FORM IS PROHIBITED.

THIS IS UNEVALUATED INFORMATION

SOURCE Radio, No 1, 1950.

THE LTK-7 TELEVISION RECEIVER

A. Korniyenko

Amateur radio builders are making more and more use of direct amplification (tuned RF) in the picture receivers of their television sets. It is much simpler to construct picture receivers by this method than to build superheterodyne receivers, and furthermore, the quality of the image and the sensitivity of the receiver will not be inferior to that of a superheterodyne.

The easiest way of amplifying the video signal is at high (radio) frequency. But the presence of several stages (more than three) may cause self-oscillations which are hard to eliminate. One of the advantages of this type of receiver is that it can be tuned directly by the image received, without employing special test equipment.

The circuit selected employs two stages of amplification at high frequency and two at low frequency. Such a receiver has relatively high sensitivity (about 300-500 microvolts) and is simple to construct and tune.

By using two stages of amplification at high frequency and shielding the receiver circuits properly, one can be almost certain that self-oscillations will not occur.

However, tuned RF sound receivers can be recommended only for amateurs living in the immediate vicinity of a television center (no further than 3-5 kilometers). At greater distances, the receiver may not be capable of loading the loudspeaker fully, since a greater RF amplification than that supplied by two stages is required for adequate operation of the discriminator used in this receiver. Increasing the number of stages of amplification might produce self-oscillations in the receiver.

- 1 -

## CLASSIFICATION

**CONFIDENTIAL**

[illegible]

**CONFIDENTIAL**

50X1-HUM

Circuit Diagram of the Television Receiver

The LTK-7 model differs from the LTK-6 by its use of a tuned RF receiver for the video channel. A lens is used to increase the size of the picture. The audio signal circuit has not been changed in any respect.

The picture receiver has two stages of RF amplification using Type 6AC7 tubes, a diode detector (6 x 6), and two stages of video amplification at low frequency using a 6AC7 and a 6AG7-type tube.

Separation of the picture and sound channels is accomplished after the first stage of RF amplification. The sound signal is capacitively coupled from this stage to a 6SA7 mixer-oscillator of the sound receiver.

Contrast control is obtained by changing the screen-grid voltage on the second RF tube. The control-grid bias of this tube remains constant regardless of the screen-grid voltage. The use of separate fixed bias for this tube gives a greater range of receiver sensitivity as the screen-grid voltage is varied. Moreover, this method of supplying negative bias practically eliminates the possibility of detuning the tuned grid circuit, which would take place in circuits with automatic grid bias, since the input capacitance of the tube is affected.

To obtain positive images with two stages of LF amplification and to apply the output voltage to the picture-tube cathode, there must be a 180-degree phase shift which is done in a diode detector circuit by applying the RF voltage to the plate of the 6 x 6 tube, instead of the cathode as in the LTK-6 model.

The voltage from the load resistor of the detector is applied directly to the first LF tube without capacitive coupling. The constant component of the detector load has a positive value. The tubes of the LF amplifier operate on automatic grid bias. To simplify the design, the screen grid supply for the 4 RF and LF tubes is obtained from the plate supply through a dropping resistor.

As mentioned above, the audio signal receiver follows the schematic diagram of the LTK-6 model. The intermediate frequency can remain the same (5.75 megacycles), or, better still, can be increased to 10-15 megacycles. In changing the intermediate frequency, it is necessary to avoid frequencies close to 6.5 megacycles, since this is the beat frequency between the picture and sound carriers.

Construction and Parts

The LTK-7 television receiver is assembled on one chassis, 450 x 350 x 60 millimeters. The arrangement of parts is almost the same as in the earlier LTK model.

The physical layout of the picture receiver is the same as that of the superheterodyne audio signal receiver. It has the same type of shielding as the IF circuits of the 6N1 receiver, but other types of shielding will also serve the purpose.

[The original document, available in CIA, goes into some detail on the scanning circuit and power supply, with the aid of a circuit diagram. The rectifier uses a 5Ts4S tube, while the scanning circuit consists of a 6N7 twin triode (one triode as a blocking oscillator, the other as a frame-synchronizing pulse selector), a 6P6 framing oscillator, a G-411 pentode (6P5S) and Type 879 high-voltage rectifier in a sweep circuit, and an LK715 A picture tube. The article includes circuit diagrams of the sound and picture receivers and a photograph of the set.]

- E N D -

- 2 -

**CONFIDENTIAL**